

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Number: 7,268,503
Issued: September 11, 2007
Name of Patentee: Yamasaki et al.
Title of Invention: VIBRATION LINEAR ACTUATING DEVICE, METHOD OF DRIVING THE SAME
DEVICE, AND PORTABLE INFORMATION APPARATUS USING THE SAME
DEVICE

**REQUEST FOR CERTIFICATE OF CORRECTION OF PATENT
FOR PTO MISTAKE (37 C.F.R. § 1.322(a))**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attention: Decision and Certificate of Correction
Branch of the Patent Issue Division

1. Attached is Form PTO/SB/44 being suitable for printing.
2. Correction of the Official Letters Patent is respectfully requested in view of the following text which appears correctly in the application file:

At Column 8, claim 1, after line 41, the following should be added:

--characterized by

(g) a zero-cross monitor interposed between the zero-cross detector and the output controller, the zero-cross monitor monitoring the zero-cross signal and prohibiting acceptance of a next zero-cross signal for a given time after input of the zero-cross signal. --as indicated in the "AMENDED SHEET" submitted on September 27, 2004.

At Column 9, claim 9, after line 17, the following should be added:

--characterized by the additional step of:

(e) starting to count depending on the judging result step (a), wherein the judging result at step (a) is kept invalidated until counting up at step (e). -- as indicated in the "AMENDED SHEET" submitted on September 27, 2004.

At Column 10, claim 13, after line 10, the following should be added:

--characterized by

(c-4) a zero-cross monitor interposed between the zero-cross detector and the output controller, the zero-cross monitor monitoring the zero-cross signal and prohibiting acceptance of a next zero-cross signal for a given time after input of the zero-cross signal.-- as indicated in the "AMENDED SHEET" submitted on September 27, 2004.

MAT-8600US

PATENT

3. Please send the Certificate to:

Name: Lawrence E. Ashery
P.O. Box 980
Valley Forge, PA 19482
(610) 407-0700

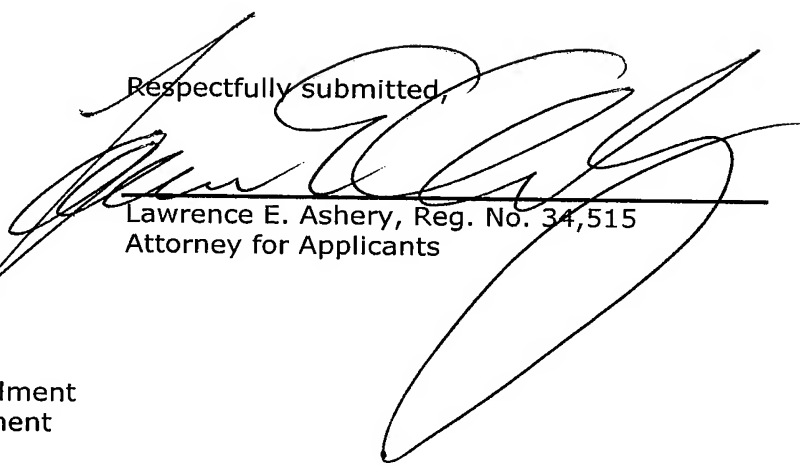
Name of Assignee: Matsushita Electric Industrial Co., Inc.

Assignment Recorded on: September 27, 2004

Reel: 016443

Frame: 0393

Respectfully submitted,


Lawrence E. Ashery, Reg. No. 34,515
Attorney for Applicants

LEA/nm

Enclosures: Form PTO/SB/44
Copy of Preliminary Amendment
Copy of Article 34 Amendment

Dated: June 30, 2008

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**UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION**

PATENT NO: 7,268,503
APPLICATION NO.: 10/508,992
ISSUED: SEPTEMBER 11, 2007
INVENTOR(S): HIROKAZU YAMASAKI AND KOJI KAMEDA

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

At Column 8, claim 1, after line 41, the following should be added:

--characterized by

(g) a zero-cross monitor interposed between the zero-cross detector and the output controller, the zero-cross monitor monitoring the zero-cross signal and prohibiting acceptance of a next zero-cross signal for a given time after input of the zero-cross signal.--

At Column 9, claim 9, after line 17, the following should be added:

--characterized by the additional step of:

(e) starting to count depending on the judging result step (a), wherein the judging result at step (a) is kept invalidated until counting up at step (e).--

At Column 10, claim 13, after line 10, the following should be added:

--characterized by

(c-4) a zero-cross monitor interposed between the zero-cross detector and the output controller, the zero-cross monitor monitoring the zero-cross signal and prohibiting acceptance of a next zero-cross signal for a given time after input of the zero-cross signal.--

Mailing Address of Sender:

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This collection of information is required by 37 CFR 1.322, 1.323 and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance completing the form, call 1-800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No: To Be Assigned
 Applicant: Hirokazu YAMASAKI, et al.
 Filed: Herewith
 Title: VIBRATION LINEAR ACTUATING DEVICE, METHOD OF DRIVING
 THE SAME DEVICE, AND PORTABLE INFORMATION APPARATUS
 USING THE SAME DEVICE
 TC/A.U.: To Be Assigned
 Examiner: To Be Assigned
 Confirmation No.: To Be Assigned
 Docket No.: MAT-8600US

PRELIMINARY AMENDMENT

Mail Stop PCT
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, VA 22313-1450

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Sir:

Prior to examination, please amend the above-identified application as follows:

- ☒ **Amendments to the Specification** begin on page **2** of this paper.
- ☐ **Amendments to the Claims** are reflected in the listing of claims which begins on page of this paper.
- ☒ **Amendments to the Drawings** begin on page **3** of this paper.
- ☐ **Amendments to the Abstract** are on page of this paper. A clean version of the Abstract is on page of this paper.
- ☐ **Remarks/Arguments** begin on page of this paper.
- ☒ **Please enter the enclosed Article 34 Amendment.**

Amendments to the Specification:

Please add the following new paragraph after the Title and before the first paragraph on page 1:

THIS APPLICATION IS A U.S. NATIONAL PHASE APPLICATION OF PCT INTERNATIONAL APPLICATION PCT/JP03/04200.

COPY

Amendments to the Drawings:

Please delete page "13/13" of the drawings, also labeled as "Reference numerals in the drawings" in its entirety.

COPY

Respectfully submitted,

Lawrence E. Ashery, Reg. No. 34,515
Attorney for Applicants

LEA:ds

Dated: September 27, 2004

P.O. Box 980
Valley Forge, PA 19482
(610) 407-0700

The Commissioner for Patents is hereby
authorized to charge payment to Deposit
Account No. 18-0350 of any fees associated
with this communication.

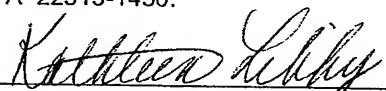
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EV 547590989 US
September 27, 2004

I hereby certify that this paper and fee are being deposited, under 37 C.F.R. § 1.10 and with sufficient postage, using the "Express Mail Post Office to Addressee" service of the United States Postal Service on the date indicated above and that the deposit is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.


Kathleen Libby

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International Patent Application PCT/JP03/04200

Applicant: MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD. et al

Our ref: PCT1953DK101cn

Date: March 18, 2004

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CLAIMS

1. A vibration linear actuating device comprising a vibrating linear actuator and a driver for driving the actuator;

the vibrating linear actuator including:

- (a) a mover having a permanent magnet magnetized in a radial direction
- (b) a stator having a coil and facing the permanent magnet; and
- (c) an elastic body for coupling the stator to the mover and energizing the mover toward a center of the stator, the driver including:
- (d) a driving section having a switching element for powering the coil;
- (e) and output controller for controlling the switching element; and
- (f) a zero-cross detector for detecting a zero-cross point of back electromotive force (BEMF) generated in the coil and outputting a zero-cross signal;

wherein the driver transmits the zero-cross signal to the output controller and powers the coil in one direction for vibrating the mover in corporation with the elastic body,

characterised by

- (g) a zero-cross monitor interposed between the zero-cross detector and the output controller, the zero-cross monitor monitoring the zero-cross signal and prohibiting acceptance of a next zero-cross signal for a given time after input of the zero-cross signal.

2. The vibration linear actuating device of claim 1, wherein the driver transmits a re-starter signal to the output controller when the zero-cross signal is halted for a given time.
3. The vibration linear actuating device of claim 1, wherein the zero-cross detector is coupled to the coil via a BEMF amplifier and a level-shift section.
4. The vibration linear actuating device of claim 1, wherein the driver further includes a timing adjuster disposed between the zero-cross detector and the output controller.
5. The vibration linear actuating device of claim 4, wherein the timing adjuster includes a phase locked loop.
6. The vibration linear actuating device of claim 1, wherein the output controller includes a pulse width modulator.
7. A method of driving a vibrating linear actuator, the actuator comprising:
a mover having a permanent magnet magnetized in a radial direction;
a stator having a coil and facing the permanent magnet; and
an elastic body for coupling the stator to the mover and energizing the mover toward a center of the stator, the method comprising the steps of:
(a) determining a zero-cross point of back electromotive force generated in the coil;
(b) determining a period for powering the coil in every cycle;
(c) determining a period for powering the coil at starting time;
(d) counting step (b) based on the determined result of step (a);
characterised by the additional step of:
(e) starting to count depending on the judging result at step (a),
wherein the judging result at step (a) is kept invalidated until counting up at step (e).

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8. The method of driving a vibrating linear actuator of claim 7 further comprising step (f) for counting for itself based on the determined result of step (a), wherein step (c) starts counting when step (f) counts up.
9. The method of driving a vibrating linear actuator of claim 8, wherein step (f) is reset depending on a next determined result.
10. A portable information apparatus comprising:
 - (a) a board;
 - (b) a vibrating linear actuator mounted to the board; the actuator including:
 - (b-1) a mover having a permanent magnet magnetized in a radial direction;
 - (b-2) a stator having a coil and facing the permanent magnet; and
 - (b-3) an elastic body for coupling the stator to the mover and energizing the mover toward a center of the stator;
 - (c) a driver mounted to the board, the driver including:
 - (c-1) a driving section having a switching element for powering the coil;
 - (c-2) an output controller for controlling the switching element; and
 - (c-3) a zero-cross detector for detecting a zero-cross point of back electromotive force (BEMF) generated in the coil and outputting a zero-cross signal;

wherein the driver transmits the zero-cross signal to the output controller and powers the coil in one direction for vibrating the mover in corporation with the elastic body.

characterised by

- (c-4) a zero-cross monitor interposed between the zero-cross detector and the output controller,

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the zero-cross monitor monitoring the zero-cross signal and prohibiting acceptance of a next zero-cross signal for a given time after input of the zero-cross signal.

11. The portable information apparatus of claim 10, wherein the vibrating linear actuator generates vibrations with a maximum amplitude in a vertical direction to the board.
12. The portable information apparatus of claim 10, wherein the driver transmits a re-starter signal to the output controller when the zero-cross signal is halted for a given time.
13. The portable information apparatus of claim 10, wherein the zero-cross detector is coupled to the coil via a BEMF amplifier and a level-shift section.
14. The portable information apparatus of claim 10, wherein the driver further includes a timing adjuster disposed between the zero-cross detector and the output controller.
15. The portable information apparatus of claim 14, wherein the timing adjuster includes a phase locked loop.
16. The portable information apparatus of claim 10, wherein the output controller includes a pulse width modulator.

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FIG. 7

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